CLAIMS

1. A liquid crystal device comprising a liquid crystal bulk layer presenting a surface-director at a bulk surface thereof, and a surface-director alignment layer comprising side-chains arranged to interact with the bulk layer at said bulk surface for facilitating the obtaining of a preferred orientation of the surface-director of the bulk layer, c h a r a c t e r i s e d in that the orientation of the molecules of the liquid crystal bulk layer and the orientation of said side-chains of the surface-director alignment layer each is directly controllable by an electric field via dielectric coupling.

2. A liquid crystal device according to claim 1, wherein the liquid crystal bulk layer and the surface-director alignment layer exhibit dielectric anisotropies ($\Delta\varepsilon$) of opposite signs.

3. A liquid crystal device according to claim 1, wherein the liquid crystal bulk layer and the surface-director alignment layer exhibit dielectric anisotropies ($\Delta\varepsilon$) of same sign.

4. A liquid crystal device according to claim 1 comprising a first and a second surface-director alignment layer, wherein the liquid crystal bulk layer and the first surface-director alignment layer exhibit dielectric anisotropies ($\Delta\varepsilon$) of opposite signs, and the liquid crystal bulk layer and the second surface-director alignment layer exhibit dielectric anisotropies ($\Delta\varepsilon$) of same sign.

5. A liquid crystal device according to claim 1, wherein the surface-director alignment layer comprises structural parts exhibiting dielectric anisotropies ($\Delta\varepsilon$) of opposite signs.

6. A liquid crystal device according to claim 2 further comprising at least one confining substrate, and wherein an orthogonal projection of said surface-director on said substrate, termed projected surface-director, presents said preferred orientation in a geometrical plane in parallel with said substrate, termed preferred field-off planar orientation, and the orientation of the molecules of said bulk layer is directly controllable by an applied electric field to perform an out-of-plane switching of said preferred planar orientation of the projected surface-director to a field-induced vertical orientation.

7. A liquid crystal device according to claim 2 further comprising at least one confining substrate, and wherein an orthogonal projection of said surface-director on a geometrical plane perpendicular to said substrate, termed projected surface-director, presents said preferred orientation, termed preferred field-off vertical orientation, and the orientation of the molecules of said bulk layer is directly controllable by an applied electric field to perform an out-of-plane switching of said preferred vertical orientation of the projected surface-director to a field-induced planar orientation.

8. A liquid crystal device according to claim 6 or claim 7, wherein the electric field is applied normally to said at least one confining substrate.

9. A liquid crystal device according to claim 3 further comprising at least one confining substrate, and the orientation of the molecules of said bulk layer is directly controllable by an applied electric field to perform an in-plane switching of an initial first planar orientation to a field-induced second planar orientation, whereas an orthogonal projection of said surface-director, termed projected surface-director, presents

said preferred orientation in a geometrical plane in parallel with said substrate, termed preferred field-induced planar orientation.

10. A liquid crystal device according to claim 9, wherein the electric field is applied in parallel with said at least one confining substrate.

11. A liquid crystal device according to any one of claims 1-10, wherein the liquid crystal bulk layer comprises a nematic liquid crystal.

12. A liquid crystal device according to any one of claims 1-11, wherein the surface-director alignment layer comprises a polymer having a polymeric backbone and side-chains attached thereto, said polymeric backbone lacks directly coupled ring structures and each side-chain of at least some of the side-chains

(i) comprises at least two unsubstituted and/or substituted phenyls coupled via a coupling selected from the group consisting of a carbon-carbon single bond (-), a carbon-carbon double bond containing unit (-CH=CH-), a carbon-carbon triple bond containing unit (-C≡C-), a methylene eter unit ($-CH_2O-$), an ethylene eter unit ($-CH_2CH_2O-$), an ester unit (-COO-) and an azo unit (-N=N-),

(ii) exhibits a permanent and/or induced dipole moment that in ordered phase provides dielectric anisotropy, and

(iii) is attached to the polymeric backbone via at least two spacing atoms.

13. A liquid crystal device according to claim 12, wherein the polymer is a polyvinyl acetal.

14. A method for manufacturing a liquid crystal device comprising the steps of:

providing a surface-director alignment layer on an inner surface of at least one substrate, and

sandwiching a liquid crystal bulk layer between two substrates, said liquid crystal bulk layer presenting a surface-director at a bulk surface thereof, and said surface-director alignment layer comprising side-chains arranged to interact with the bulk layer at said bulk surface for facilitating the obtaining of a preferred orientation of the surface-director of the bulk layer, c h a r a c t e r i s e d in that the orientation of the molecules of the liquid crystal bulk layer and the orientation of said side-chains of the surface-director alignment layer each is directly controllable by an electric field via dielectric coupling.

15. A method of controlling a liquid crystal bulk layer comprising the step of aligning a liquid crystal bulk layer presenting a surface-director at a bulk surface thereof by use of a surface-director alignment layer comprising side-chains arranged to interact with the bulk layer at said bulk surface for facilitating the obtaining of a preferred orientation of the surface-director of the bulk layer c h a r a c t e r i s e d in that the orientation of the molecules of the liquid crystal bulk layer and the orientation of said side-chains of the surface-director alignment layer each is directly controllable by an electric field via dielectric coupling.